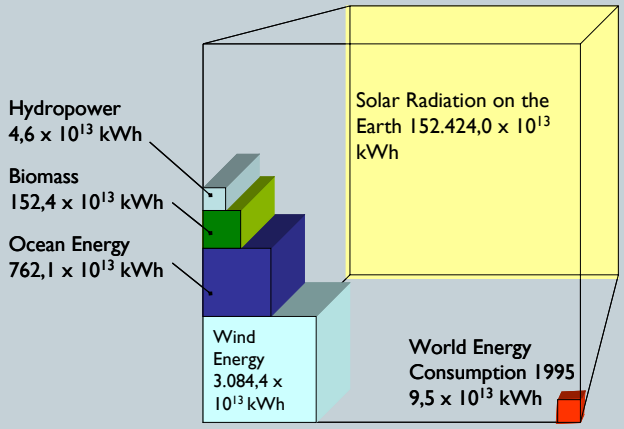
Renewable Energy Policy

David Nicol
CRSES FORUM
2 AUGUST 2007

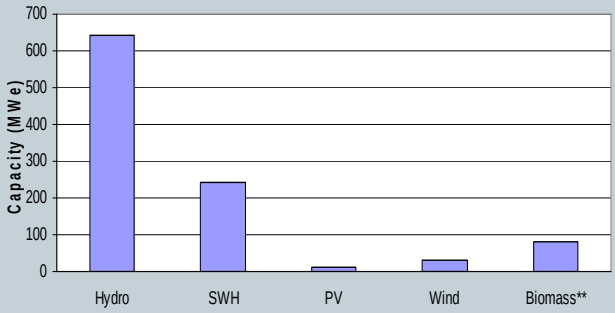
Renewables in context - global potential



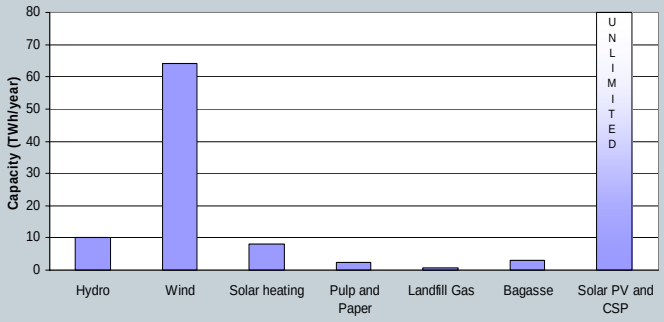
Renewables in context – fossil fuel resources in SA

Resource	**Reserves** (TWh)	**Lifespan** (no. of years supplying total energy needs)
Coal	360556	302
Uranium	43848	36.7
Crude oil	533	0.44
Natural gas	394	0.33
Coal bed methane	972	0.8

Renewables in context – current capacity in SA



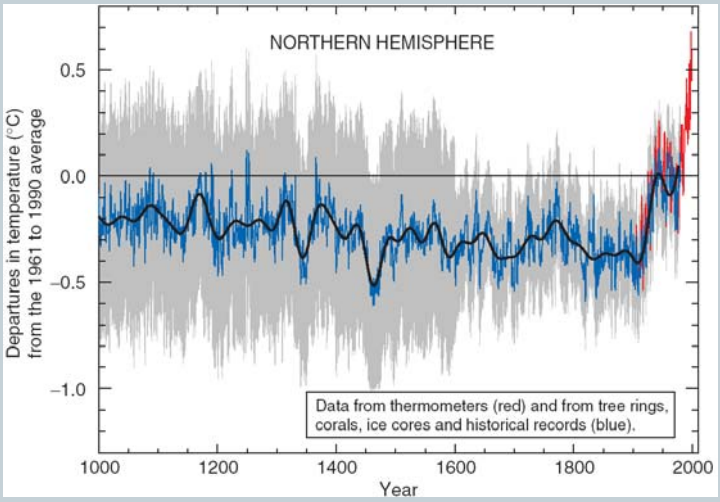
Renewables in context – potential in SA



Factors driving renewable energy policy

- **Environmental**
  - Local pollution levels, Nuclear
  - **Climate change**
- Social
  - Democratisation of power – 30%
  - Energy costs for the poor
- Economic
  - Innovation
  - Industrial policy
  - Stimulating new business
- Energy security

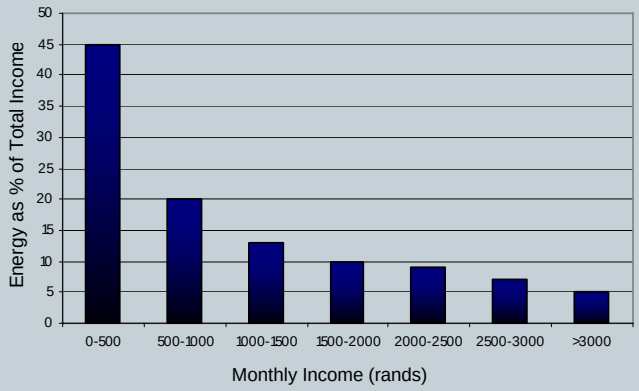
Climate Change



Factors driving policy change

- Environmental
  - Climate change
  - Local pollution levels and Nuclear
- **Social**
  - Democratisation of power – 30%
  - **Energy costs for the poor**
- Economic
  - Innovation
  - Industrial policy
  - Stimulating new business
- Energy security

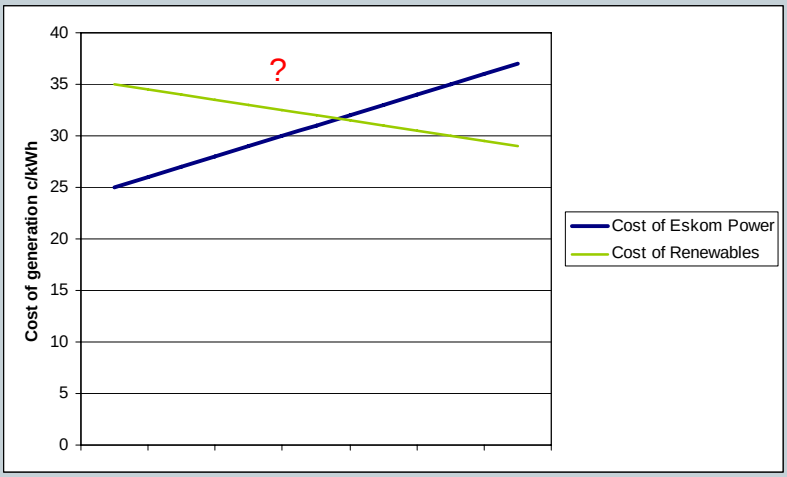
Energy Costs for the Poor



Factors driving policy change

- Environmental
  - Climate change
  - Local pollution levels
- Social
  - Democratisation of power – 30%
  - Energy costs for the poor
- **Economic**
  - Innovation - Industrial policy - Stimulating new business
  - **Avoided cost – are renewables cheaper?**
- Energy security

Renewable Costs



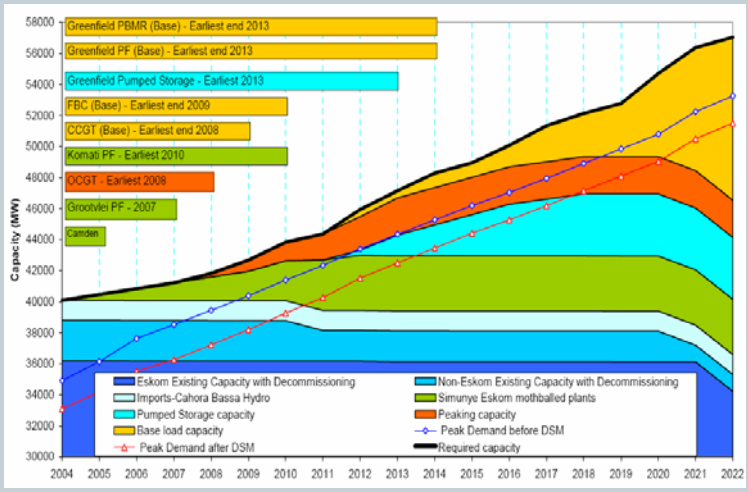
Factors driving policy change

- Environmental
  - Climate change
  - Local pollution levels
- Social
  - Democratisation of power – 30%
  - Energy costs for the poor
- Economic
  - Innovation - Industrial policy - Stimulating new business
  - Avoided cost – are renewables cheaper?
- **Energy security**

Why policy is important?

- **Right policies support the right trajectory – NIRP vs IEP**
- Financial sustainability of renewables
  - how to compete with cheap coal?
  - Full cost accounting
  - Green power market
- Creation of an enabling environment
  - Funding for research
  - Power Purchase Agreements
  - Non-discriminatory grid access
- Objectives must be clear
  - Is it about climate change only?
  - Is it about energy security?
  - Is it about industrial policy?

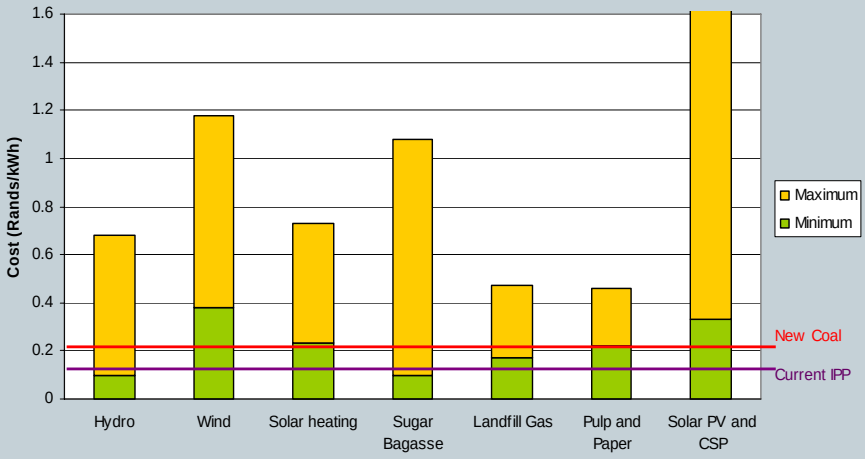
National Integrated Resource Plan



Why policy is important?

- Right policies support the right trajectory – NIRP vs IEP
- Financial sustainability of renewables
  - **Competition with cheap coal**
  - Full cost accounting
  - Green power market
- Creation of an enabling environment
  - Funding for research
  - Power Purchase Agreements
  - Non-discriminatory grid access
- Objectives must be clear
  - Is it about climate change only?
  - Is it about energy security?
  - Is it about industrial policy?

The cost of renewable energy



Why policy is important?

- Right policies support the right trajectory – NIRP vs IEP
- Financial sustainability of renewables
  - Competition with cheap coal
  - Full cost accounting
  - Green power market
- Creation of an enabling environment
  - Funding for research
  - Power Purchase Agreements
  - Non-discriminatory grid access
- Objectives must be clear
  - Is it about climate change only?
  - Is it about energy security?
  - Is it about industrial policy?

SA Energy Policy

- Objectives
  - Ensuring that the entire population has **access** to energy by 2014.
  - Making energy services more accessible, affordable and reliable, especially for the **poor**.
  - Reducing South Africa's dependency on coal and **diversifying** primary energy sources.
  - Working towards energy provision that is **environmentally** responsible.
  - Encouraging **private sector** investment in the energy sector.

South African policy - White Paper on Renewable Energy (2003)

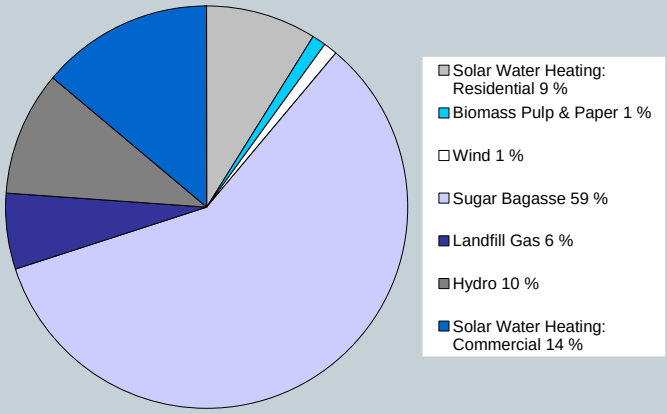
- Objectives
  - To create an **enabling** environment
  - To demonstrate commitment to the **Kyoto Protocol**
  - To align with White Paper on Energy - **Diversity** and **Security** of supply
  - To promote the introduction of **IPPs**
  - To promote **capacity** building in the public and private sector
  - To promote the role of **women** in energy
  - To promote **BEE** in the sector
  - To create **employment** opportunities in renewable energy

South African policy - White Paper on Renewable Energy (2003)

- Target
  - "an additional **10 TWh** Renewable Energy contribution of final energy consumption by 2013"
  - It is a **cumulative target**, with the government expected to add approximately 1.2 TWh per annum of renewable energy, over the next 6 years.
  - The target will be **divided** into electricity generation and non-electricity generation. A possible scenario may be:
    - Electricity Generation - 5 TWh of electricity generated from renewable energy, approximately 2% of electricity demand by 2013.
    - Non-electricity - 5 TWh displacement of coal fired power station capacity with solar water heating or 8% of diesel replaced with biodiesel.

South African policy - White Paper on Renewable Energy (2003)

- Target – least cost approach



Support structures in place

- **SANERI** – subsidiary CEF – research and funding
- **REFSO** – DME - support and funding
- **CDM** – international – carbon funding
- **TRECs** – local - green attribute funding
- **DSM** – Eskom - energy efficiency – 50% funding
- **Tax incentives** – treasury – biofuels

Development attributes of RE

- High costs
  - Capital
  - Development
  - Transaction
- Difficult to raise finance
  - High risk
  - Marginal returns
- Lack of experience
- Financial viability
  - Long lead times
  - Economies of scale
  - Not attractive without CDM and TREC
- R & D lagging

Policies options for SA

- From prescriptive to economic incentives
- Difficulty establishing amounts
- Difficulty in forcing distributors to buy (Eskom)
- Level of government involvement and cost important
- Two basic forms of subsidy
  - Fixed quantity
  - Fixed price

- Feed in tarrif (fixed price)
  - set price for specific technology guaranteed
  - successful in Europe
  - more flexible less bureaucratic
  - subsidised through 'green' sale or as a tax
    - For 2% RE target (in 2013), subsidy of 10c/kWh: **0.2c/kWh**

Table 2. German fixed price payments by technology, with installed capacity, output (2005)

Resource	Limit	€cent/kWh	Decrease in incentive (% per annum)	MW (2005)	GWh (2005)
Hydropower	500 kW	9.67	0.00%	4,680	21,524
	5 MW	6.65			
Landfill gas, sewage gas, mine gas	500 kW	7.67	1.50%	2,192	13,444
	5 MW	6.65			
Biomass	150 kW	11.5	1.50%		
	500 kW	9.9			
	5 MW	8.9			
	20 MW	8.4			
Geothermal	5 MW	15	1.00%	0.2	0.2
	10 MW	14			
	20 MW	8.95			
	Above 20 MW	7.16			
Onshore wind	First five years	8.7	2%	26,500	18,428
	Up to 20 years	5.5			
Offshore wind	First twelve years	9.1	2%		
	Up to 20 years	6.19			
Photovoltaics	Ground mounted	45.7	5%	1,508	1,000
	Building mounted (30 kW)	57.4			
	Building mounted (<100 kW)	54.6			
	Building mounted (>100 kW)	54			

ɹurce: Bundesministerium für Umwelt Naturschutz und Reaktorsicherheit (2004); Staiss et al. (2006)

German FIT

Homeowners, farmers and industrialists spent over US$10 billion on RE last year

Germany operates more wind, solar and biomass plants than any other country

Approx 10% of total electricity

German heavy industry employs 70,000 in the wind energy sector alone

Policies options for SA - continued

- Renewable energy portfolio standards (fixed quantity)
  - Distributors obliged to meet set % RE
  - Adopted by a number of states in the US
  - REPS can be traded – Market (green certificate)
- Texas RPS
  - Established in 1999
  - 2000 MW by 2009 - reached in 2005
  - Over US$1 billion in wind invested
  - REC system implemented – 1 REC = 1MWh

Policies options for SA - continued

- Renewables obligation (fixed quantity)
  - A set amount of RE is put to tender (awarded by price)
  - Formalised in the UK
  - Expensive and bureaucratic process
- UK RO scheme
  - Originally set at 3% in 2003, it now stands at 6.7%, rising to 15.4% by 2015
  - Renewables Obligation Certificates (ROCs) = 1 MWh RE

Landfill gas	33.6%
Co-firing	19.5%
Hydro (<20 MW)	18%
Onshore wind	15.9%
Biomass	7.6%
Offshore wind	2.6%
Sewage gas	2.3%
Others (includes ACFT, micro hydro, wave power & PV)	0.5%

Where to for South Africa?

- Policy needs to be clear
  - Government role established
- A choice must be made
  - Feed-in tariff
  - Green certificate system
- Enabling environment created
  - Financial
  - Capacity within national and local governments
  - Grid access
  - Research

Thank You